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Stainless Steels Corrosion in Sodium Fast Reactor: Feedback from Risks during Maintenance Operations (SCC in Caustic Solution and Intergranular Corrosion by Acid Solution)

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Stainless steels are widely used in Sodium Fast Reactor and exhibit a very satisfactory feedback regarding their behavior in contact with high purity sodium.

The French past experience with Phenix and Superphenix confirmed this trend but it also highlighted that utilities have to take care at material susceptibility to different corrosion mechanisms during maintenance operations: Stress Corrosion Cracking (SCC) induced by caustic solution and Intergranular corrosion induced by acid solution used during maintenance operation.

In this paper, more than an overview of these mechanisms, the feedback and lessons learned from Phenix operation and maintenance experience will be presented as well as the present opportunity of materials investigations on components with Phenix dismantling. Finally, the precautions for ASTRID design and future operation will be highlighted.

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